

AMENDMENTS TO THE DRAWINGS

The drawings have been amended as follows (see Appendix for replacement sheets 2/17, 7/17, 8/17, 12/17, 14/17 and 17/17):

Figure 3 has been amended, replacing the numeral 21 with the numeral 32.

Figure 13 has been amended, replacing numeral 29 with 38, numeral 31 with 40 and numeral 21 with 32, and removing the numerals 33 and 35.

Figure 14 has been amended, removing numerals 722 and 724.

Figure 28 has been amended, adding numeral 622.

Figure 34 has been amended, replacing the numeral 720 with 422, and replacing the numeral 422 with 720.

Figure 39 has been amended, adding numerals 860 and 872.

REMARKS

Claims 1, 8, 9 and 39 have been amended. Claim 7 and 47 have been cancelled.

Anticipation – 35 U.S.C. 102(b)

The Examiner has rejected claims 1-3, 6, 15-17, 19, 20, 27 and 39 under 35 U.S.C. 102(b) as being anticipated by Iwase et al. (EP 924,785).

Amended independent claim 1 recites, among other things:

an inlet opening, a first plurality of inlet conduits, and a distribution area between said inlet opening and said first plurality of conduits for distributing fluid to said first plurality of conduits for communication to said fluid dispersion area; and

an outlet opening and an outlet conduit, said outlet conduit being in communication with said fluid dispersion area and said outlet opening to facilitate communication of fluid between said fluid dispersion area and said outlet opening.

Similarly, amended independent claim 39 recites:

a first inlet opening for receiving anode reactant fluid, first plurality of inlet conduits, and a first distribution area between said first inlet opening and said first plurality of inlet conduits for distributing anode reactant fluid to said first plurality of inlet conduits for communication of said anode reactant fluid to said first fluid dispersion area,

a first outlet opening and first outlet conduit, said first outlet conduit being in communication with said first fluid dispersion area and said first outlet opening to facilitate communication of anode reactant fluid

between said first fluid dispersion area and said first outlet opening;
and

Amended independent claim 39 uses parallel language in connection with a second fuel supply apparatus.

Iwase et al. discloses holes **105** and **108** (Figure 2 and paragraphs 45-47). Hole **105** is not an inlet conduit in communication with an inlet opening, a distribution area or a fluid dispersion area, and similarly hole **108** is not an outlet conduit in communication with a fluid dispersion area or an outlet opening. Holes **105** and **108** may be similar to inlet openings and output openings respectively, but Iwase et al. does not disclose “inlet conduits” or “outlet conduits”. Therefore, Iwase et al. does not disclose nor suggest all of the elements of amended independent claims 1 or 39, and therefore does not anticipate these claims. As claims 2-3, 6, 15-17, 19, 20 and 27 all depend from amended claim 1, these claims are also not anticipated by Iwase et al. for the same reasons as amended claim 1 and due to the additional subject matter they recite. Accordingly, the Applicant respectfully requests that the rejection under 35 U.S.C. 102(b) of claims 1-3, 6, 15-17, 19, 20, 27 and 39 is overcome.

The Examiner has rejected Claims 1-3, 6, 11, 16, 17, 19, 27, 33, 37, 39 and 47 under 35 U.S.C. 102(b) as being anticipated by Surampudi et al. (US Application 2001/0050230). Amended independent claim 1 recites an apparatus having:

a unitary gas-impermeable body having... an inlet opening, a first plurality of inlet conduits, and a distribution area between said inlet opening and said first plurality of conduits for distributing fluid to said first plurality of conduits for communication to said fluid dispersion area...

Amended independent claim 39 mirrors this language in connection with both a first fluid supply apparatus and a second fluid supply apparatus.

Surampudi et al. discloses a fuel supply chamber **602** (paragraph 136 and Fig. 6) which the Examiner has characterized as an inlet conduit, and an “output conduit” **614** (paragraph 140). Surampudi et al. does not disclose or suggest a “distribution area between said inlet opening and said first plurality of conduits”. As such, Surampudi et al. does not disclose or suggest all of the elements of amended independent claims 1 or 39, and does not anticipate these claims. As claims 2-3, 6, 11, 16, 17, 19, 27, 33 and 37 all depend from claim 1, these claims are also not anticipated by Surampudi et al. for the same reasons as claim 1 and due to the additional subject matter they recite. Accordingly, the Applicant submits that the rejection under 35 U.S.C. 102(b) in connection with claims 1-3, 6, 11, 16, 17, 19, 27, 33, 37 and 39 is overcome.

The Applicant’s independent claim 47 has been cancelled and therefore the rejection as it pertains to claim 47 is overcome:

Obviousness – 35 U.S.C. 103(a)

Under 35 U.S.C. 103(a), the Examiner has rejected dependent claims 10-13, 18, 21 and 22 as being unpatentable over Iwase et al., claims 10, 12-14, 18, 21 and 22 as being unpatentable over Surampudi et al., claims 4 and 5 as being unpatentable over either Iwase et al. or Surampudi et al., each in view of Leger et al. (US 6,686,082), claims 7 and 9 as being unpatentable over Surampudi et al. in view of Rock (US 6,699,614), and claim 8 as being unpatentable over Surampudi et al. in view of Rock and further in view of Leger et al.

The requirements for a *prima facie* case of obviousness have been well established by the Court of Appeals for the Federal Circuit, and are concisely summarized in M.P.E.P. § 2142 and 2143, which confirm that three basic criteria must be met. First, there must be some suggestion

or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

The Examiner has rejected dependent claims 10-13, 18, 21 and 22 under 35 U.S.C. 103(a) as being unpatentable over Iwase et al. These claims all ultimately depend from amended independent claim 1. Above, claim 1 has been shown to distinguish over Iwase et al. because Iwase et al. fails to disclose "input conduits" or "output conduits" as claimed in the Applicant's claim 1, or indeed any manner of "input conduit" or "output conduit" of a similar nature.

In particular, claim 1 recites:

an inlet opening, a first plurality of inlet conduits, and a distribution area between said inlet opening and said first plurality of conduits for distributing fluid to said first plurality of conduits for communication to said fluid dispersion area; and

an outlet opening and an outlet conduit, said outlet conduit being in communication with said fluid dispersion area and said outlet opening to facilitate communication of fluid between said fluid dispersion area and said outlet opening.

The inlet conduit and outlet conduit provide communication between the inlet opening and distribution area, and output opening, respectively, and the fluid dispersion area. Iwase et al. provides nothing that would lead

one of ordinary skill in the art to the subject matter contained in the Applicant's amended independent claim 1, from which claims 10-13, 18, 21 and 22 depend. Iwase et al. does not disclose nor suggest any motivation for employing inlet conduits or outlet conduits of the type claimed in the Applicant's claim 1, or at all. Furthermore, the Examiner has not suggested that the independent claim 1 originally on file was obvious in view of Iwase et al. Therefore, the Applicant submits that dependent claims 10-13, 18, 21 and 22 are also allowable due to their ultimate dependence upon claim 1, as well as the additional subject matter they recite. The Applicant respectfully submits that the rejection under 35 U.S.C. 103(a) of claims 10-13, 18, 21 and 22 is overcome.

The Examiner has rejected claims 10, 12-14, 18, 21 and 22 under 35 U.S.C. 103(a) as being unpatentable over Surampudi et al. These claims all ultimately depend from amended independent claim 1. Above, claim 1 has been shown to distinguish over Surampudi et al. because Surampudi et al. fails to disclose or suggest a "distribution area between said inlet opening and a first plurality of conduits" as claimed in the Applicant's claim 1, or in any similar manner.

In particular, claim 1 recites:

a unitary gas-impermeable body having... an inlet opening, a first plurality of inlet conduits, and a distribution area between said inlet opening and said first plurality of conduits for distributing fluid to said first plurality of conduits for communication to said fluid dispersion area...

As noted above, Surampudi et al. discloses a fuel supply chamber **602** (paragraph 136 and Fig. 6) which the Examiner has characterized as an inlet conduit, and an "output conduit" **614** (paragraph 140). Surampudi et al. does not disclose or suggest a "distribution area between said inlet opening and said first plurality of conduits", and indeed fails to disclose

an inlet opening or a distribution area at all. Therefore, Surampudi et al. provides nothing that would lead one of ordinary skill in the art to the subject matter contained in the Applicant's amended independent claim 1. Surampudi et al. neither discloses nor suggests any motivation for employing a distribution area between said inlet opening and a first plurality of conduits of the type claimed in the Applicant's claim 1, or at all. Furthermore, the Examiner has not suggested that the independent claim 1 originally on file was obvious in view of Surampudi et al. Therefore, the Applicant submits that dependent claims 10, 12-14, 18, 21 and 22 are also allowable due to their ultimate dependence upon claim 1, as well as the additional subject matter they recite. The Applicant respectfully submits that the restriction under 35 U.S.C. 103(a) for claims 10, 12-14, 18, 21 and 22 is overcome.

The Examiner has rejected claims 4 and 5 as being unpatentable over either Iwase et al. or Surampudi et al., each in view of Leger et al. (U.S. Patent 6,686,082).

Claims 4 and 5 are ultimately dependent from the Applicant's amended independent claim 1. In accordance with the foregoing, the Applicant has shown that the amended independent claim 1 is not obvious in view of either of Iwase et al. or Surampudi et al.

Leger et al. discloses fuel cell stacks with flow *channels* (column 2, lines 13-15, 38-39, 59-62, etc.). Leger et al. is directed to overcoming the elevated pressure requirements and surface area requirements of constant cross-section channels (column 1, lines 19-22, 37-40, 60-63) by introducing decreasing cross-section channels (column 2, lines 15-17, Figure 2).

Surampudi et al. discloses island pressing areas **608** in a grid layout (Figure 6) to increase the turbulence adjacent to the islands to "stir[] the fuel in the chamber," "form a more even flow through the system" and "facilitate[] flow between each of the islands." The Applicant submits that there is no

suggestion or motivation to combine the teachings of Surampudi et al. with Leger et al. Surampudi et al. appears to be directed towards increasing *turbulence* in a gas flow grid, while Leger et al. appears to address the issues of elevated *pressure* and *surface area* requirements in gas flow channels. Moreover, the Applicant submits that combining the decreasing cross-section channels of Leger et al. with the grid of island pressing areas of Surampudi et al. would defeat the desired turbulence-generating function of Surampudi et al., and that such a combination has no reasonable expectation of success. Since one would have to choose either channels or a grid, the function of one or the other would be defeated by selecting one or the other since one cannot have both channels and grid simultaneously. Therefore, a *prima facie* case of obviousness cannot be made out for Surampudi et al. in light of Leger et al. Amended independent claim 1 is not obvious in view of Surampudi et al., as noted above, and is also not obvious in view of Surampudi et al. combined with Leger et al. It follows that claims 4 and 5 are not obvious because of their ultimate dependence on claim 1 and for the additional subject matter they recite.

Iwase et al. discloses a gas passage (paragraph 20) with a width designed to equalize the partial pressure therein (paragraph 14). The gas passage width may increase to a maximum at a point midway between gas inlets and gas outlets (paragraph 18). The Applicant submits that there is no suggestion or motivation to combine the teachings of Iwase et al. with Leger et al. given their different architectures and design goals. Moreover, the Applicant submits that combining the decreasing cross-section channels of Leger et al. with the partial pressure equalizing gas passage width profile of Iwase et al. would defeat the functioning of both designs, and therefore has no reasonable prospect of success. Thus, a *prima facie* case of obviousness cannot be made out for Iwase et al. in light of Leger et al. Amended independent claim 1 is not obvious in view of Iwase et al., as shown above, and is also not obvious in view of Iwase et al. combined with Leger et al. It follows that claims 4 and 5 are not obvious because of their ultimate dependence on claim 1 and for the additional subject matter they recite.

In light of the foregoing, the Applicant respectfully submits that the rejection under 35 U.S.C. 103(a) of claims 4 and 5 is overcome.

The Examiner has rejected claims 7 and 9 as being unpatentable over Surampudi et al. in view of Rock (U.S. Patent 6,699,614). The Applicant has presently amended the claims to cancel claim 7, therefore the rejection as it pertains to claim 7 is overcome. Therefore, only the rejection of claim 9 will be addressed below.

Claim 9 depends from amended independent claim 1. In accordance with the foregoing, the Applicant has submitted that claim 1 is not obvious in view of Surampudi et al.

Rock discloses "a supply manifold groove **72**" and "an exhaust manifold groove **74**" (column 4, lines 26-30, Figures 2, 4, 5) for the supply and exit, respectively, of reactant gas to a flow field.

As pointed out by the Examiner, Surampudi et al. does not disclose a distribution area between the sets of conduits and the adjacent opening. Furthermore, the Examiner points out that such a distribution area "would help to equalize gas pressure going into or out of the flow field." However, Surampudi et al. discloses that "[n]arrow nozzle-like elements **604**[sic] cause a large pressure drop therealong... much greater than any pressure drop along the supply. This evens the flow within the cells and among the cells" (paragraph 136). Similar nozzle construction is also disclosed for the output conduit 614. It is evident that Surampudi et al. discloses a mechanism for equalizing gas pressure going into and out of the flow field, and that such mechanism does NOT include "a distribution area between said inlet opening and said first plurality of conduits" as recited in the Applicant's amended claim 1, or "a receiving area between said second plurality of conduits and said outlet opening" as recited in the Applicant's amended claim 9. The Applicant respectfully submits that because Surampudi et al. already include a gas flow

equalization mechanism, other than the claimed “distribution area” and “receiving area,” there is no suggestion or motivation provided by Surampudi et al. to modify the reference or to look elsewhere for additional solutions, such as the claimed distribution area.

Further, the Applicant submits that the combination of Surampudi et al. and Rock lacks a reasonable expectation of success. As explained above, Surampudi et al. already discloses a mechanism for equalizing gas flow. The Applicant submits that the addition of a distribution area such as an intake manifold **72** or of a receiving area such as an exhaust manifold, both disclosed by Rock, to the fuel chamber **602** and output conduit **614** of Surampudi et al. would NOT result in further improved gas equalization. For example, since Surampudi et al. disclose that gases enter the fuel supply chamber **602** from a lateral direction, the addition of Rock’s intake manifold structure could create turbulence within the fuel chamber **602** and thus possibly result in unequal pressure distribution between the nozzles **606** and randomly fluctuating back-pressure on the fuel supply.

In light of the above, the Applicant submits that Surampudi et al. in view of Rock fails to satisfy the requirements for a *prima facie* case of obviousness for both claim 1 and claim 9. Accordingly, the Applicant respectfully submits that the rejection under 35 U.S.C. 103(a) of amended claim 9 is overcome.

The Examiner has rejected claim 8 is as being unpatentable over Surampudi et al. in view of Rock as applied to the Applicant’s previous claim 7, and further in view of Leger et al.

Leger discloses flow *channels* (column 2, lines 13-15, 38-39, 59-62, etc.). Leger et al. is directed to overcoming the elevated pressure requirements and surface area requirements of constant cross-section channels (column 1, lines 19-22, 37-40, 60-63) by introducing decreasing cross-section channels (column 2, lines 15-17, Figure 2).

Above, the Applicant has already shown that there is no suggestion or motivation, nor any reasonable expectation of success, in combining an intake manifold 72 or exhaust manifold disclosed by Rock, to the fuel chamber 602 or output conduit 614 of Surampudi et al. This lack of suggestion and motivation, as well as lack of any reasonable expectation of success, is not alleviated, and indeed may be exacerbated, by the addition of a flow field with monotonically decreasing cross sectional area as disclosed by Leger et al. There is no suggestion or motivation to apply Leger et al. to Surampudi et al. as Leger et al. exclusively speaks of flow channels in a fuel cell, while Surampudi et al. discloses only a grid of islands in a flow field (Figure 6). In addition, the application of the decreasing cross sectional area of Leger et al. to the flow field of Surampudi et al. would likely reduce the level of turbulence sought in Surampudi by reducing the total area of the flow field and changing the spacing of the output nozzles. Such a reduction in turbulence is not desirable according to the Surampudi et al. teachings (paragraph 140). Additionally, applying the decreasing cross sectional area of Leger et al. to a flow field would not improve the operation of the intake manifold 72 or exhaust manifold disclosed by Rock such that it would no longer interfere with the gas pressure equalization function of the Surampudi et al. nozzles. Such an intake manifold 72 or exhaust manifold would be present beyond the flow field of Leger et al. and would have little interaction with its decreasing cross-section channels.

As there is no suggestion or motivation to apply Leger et al. to Surampudi et al. and Rock, and no reasonable expectation of success or in making such a combination, the Applicant submits that this combination of references fails to satisfy the requirements for a *prima facie* case of obviousness for claim 8. Accordingly, the Applicant respectfully submits that the rejection under 35 U.S.C. 103(a) of amended claim 8 is overcome.

Informalities

The Examiner has objected to the disclosure due to informalities. Appropriate corrections have been made, as follows.

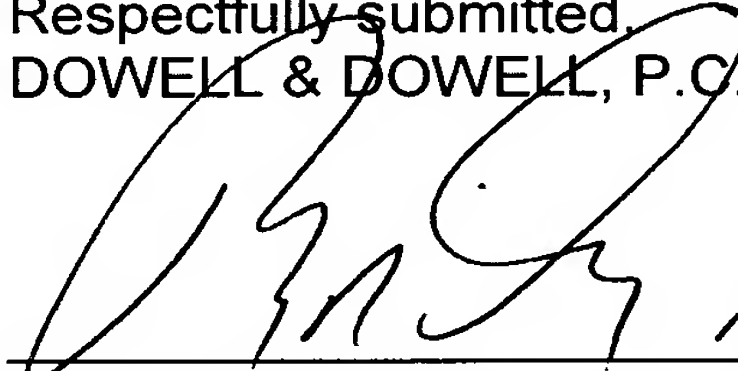
The numeral 32 now appears in Figure 3, as indicated on page 18. Numerals 33 and 35 have been removed from Figure 13, and numeral 29 has been replaced with 38, numeral 31 with 40 and numeral 21 with 32. Numerals 722 and 724 have been removed from Figure 14. The Applicant notes that the following numerals from Figure 14 appear in the specification: 405 (at p.35 line 12), 450 (at p.28 line 19), 504 (p.30 line 20), 550 (p.32 line 1), 631 (p.35 line 12), and 663 (p.36 line 9). Numeral 622 now appears in Figure 28. The numeral 720 has been replaced with 422, and the numeral 422 with 720, in Figure 34. The numerals 860 and 872 have been added to Figure 39.

Having addressed all of the Examiner's informality objections, the Applicant respectfully requests that such objections be withdrawn.

The Applicant respectfully requests a one-month extension of time and further favorable consideration of the application.

Small Entity status has already been established.

Respectfully submitted,
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10/26/2006

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